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(56) Documents Cited
GB 2288712 A GB 2274521 A GB 2269964 A
NL 009400392 A US 5448110 A

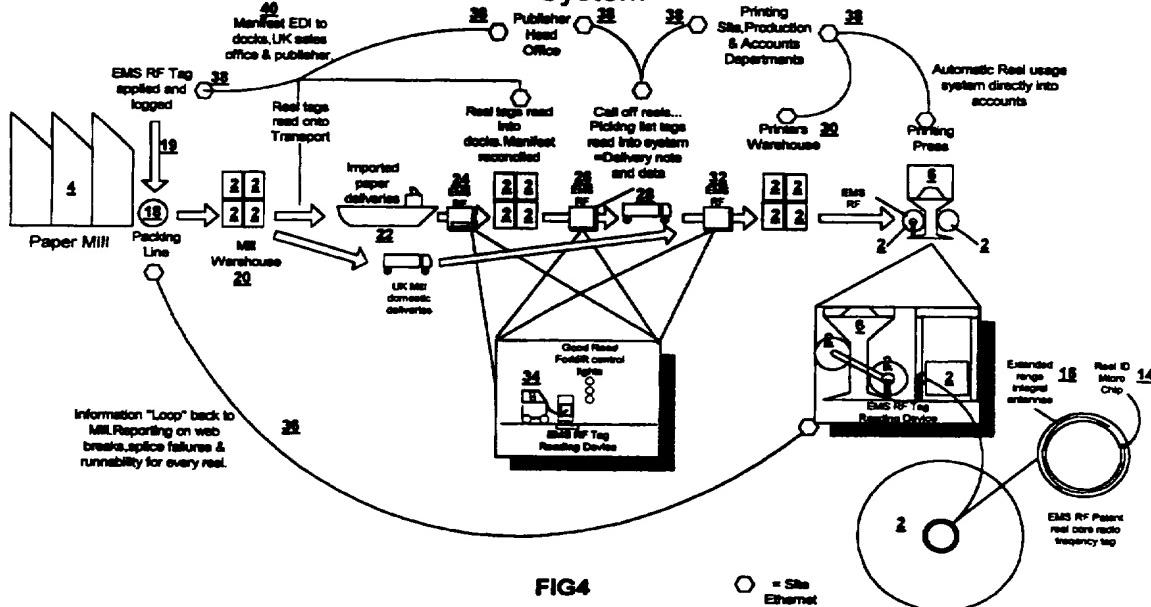
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INT CL⁶ G01V 15/00 , G06K 7/10
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(54) Abstract Title

A transponder mounted on a core of a reel of paper to track the paper from the mill to a printing press

(57) A transponder (12 in fig.s 1-3) is provided by a radio frequency chip 14 and an antenna 16 encapsulated between two layers of plastic. This is then wrapped around the circumference of a core (10) and paper (8) is rolled onto the core over the transponder. Logging means then logs the tag after production in the paper mill 4. A first reader means 24, 26 and/or 32 which may be provided by fork lift truck 34 reads the information from the tag between the paper mill and the printing press 6 to provide data on the location of the reel of paper 2. Second reader means then reads information from the tag as it is being used in the printing press to provide data on the use of the reel of paper. A control means receives data from the reader means and transmits the data to a station 38 requiring information on the reel.

EMS RF Integrated Paper Tracking System



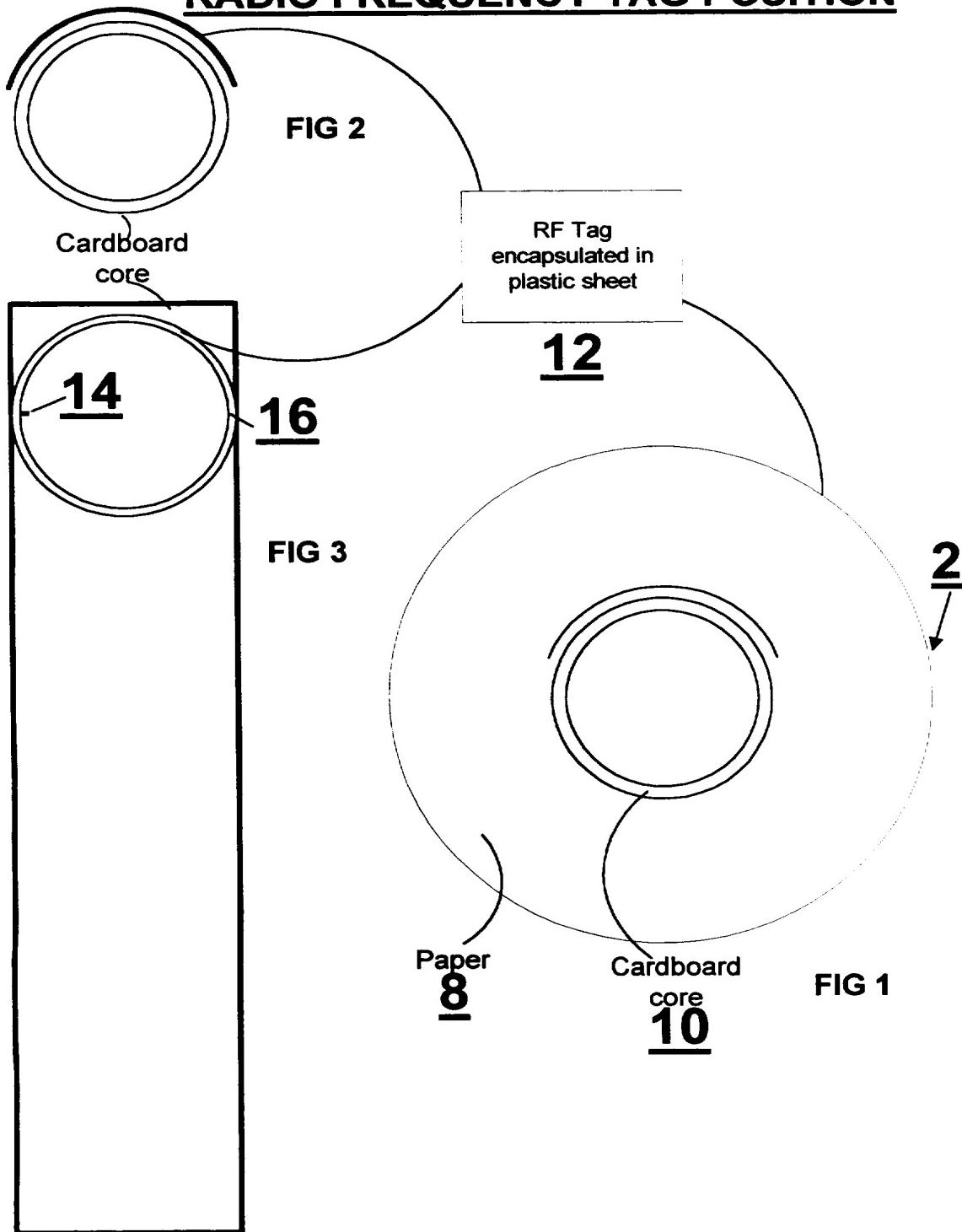
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

GB 2 333 207 A

1/4

RADIO FREQUENCY TAG POSITION



EMS RF Integrated Paper Tracking System

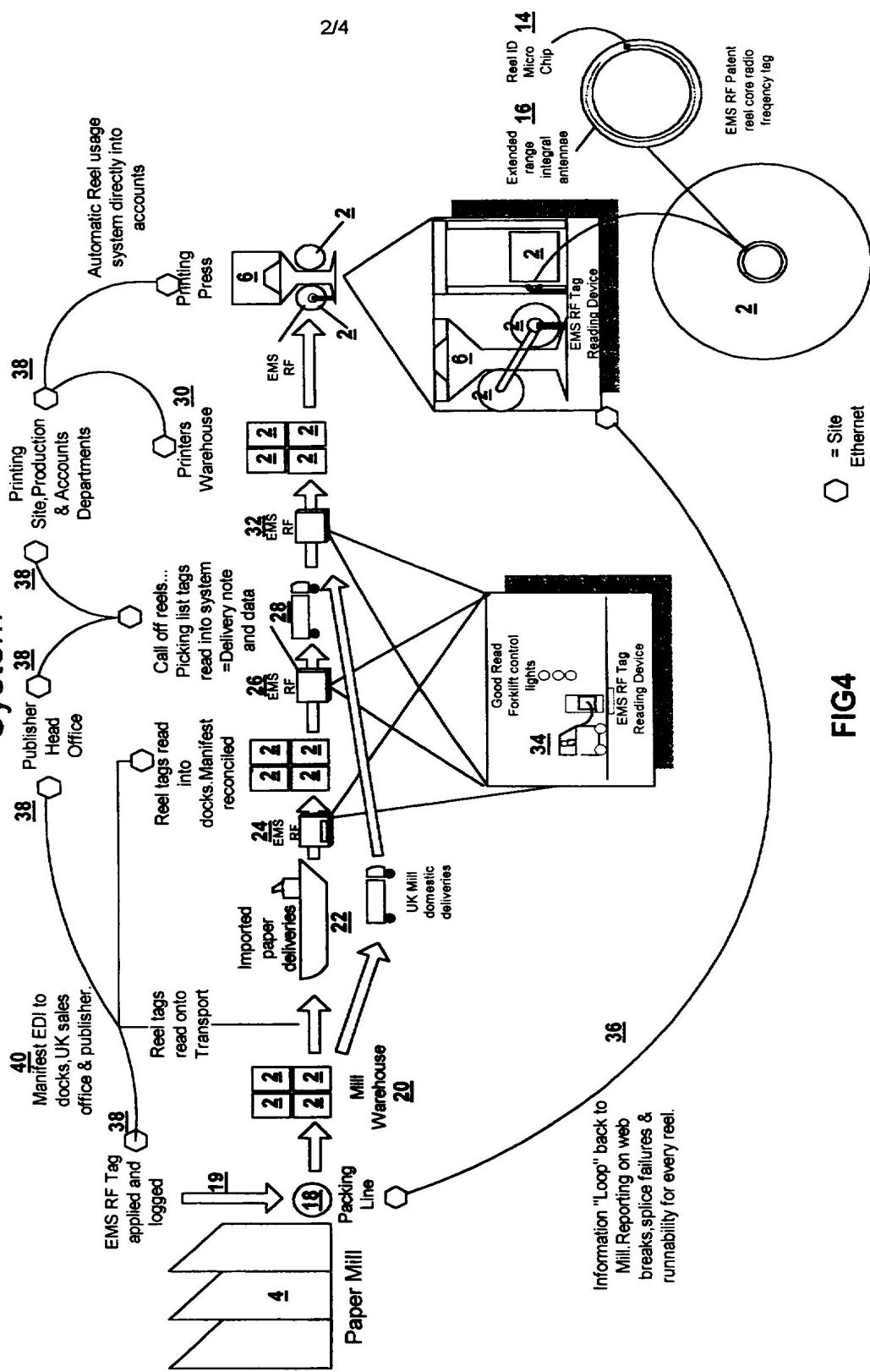


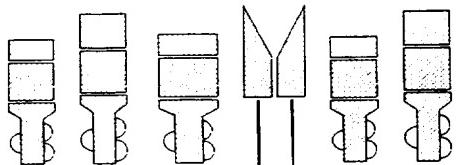
FIG4

EMS NewsPrint Control System
General Hardware Configuration

3/4

Press Hall

Sensors on press for condition monitoring to provide screen based analysis.

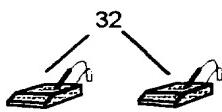


Sensors on folders and stream counters on publishing line to provide product count to NPCsys.

Job information input via "Schedule" software and operated from press console. (see below)



42



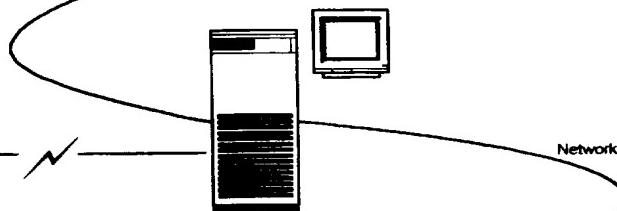
Barcode pens on press consoles for job control.

Barcode pens in reel stand areas for event reporting, i.e. webbreaks etc.

32

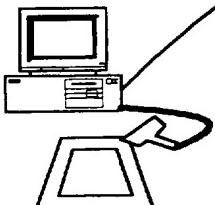
Product count at folder into I/O card in PC "Controller" on press deck running "Control" software.

Modem for stock reports and remote diagnostics.



File server. (Pentium PC)
NPCsys central database.

NPCsys Delivery point and reel stand input PC.(486)

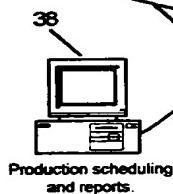


Newsprint usage:
Full and part reel usage

All delivery details:
Delivery No.
No. of reels
Suppliers
Grammage
Width
Weight
Owner
Location

Barcode input for reel stock control.

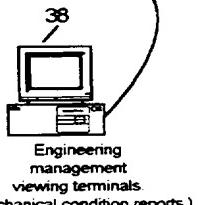
Output on Ethernet to Production, Accounts and Management network, and printers



38
Production scheduling and reports.



38
Production management viewing terminals. (All reports.)



38
Engineering management viewing terminals. (Mechanical condition reports.)

FIG5

Executive Monitoring System

Executive Monitoring System

EMS - NewsPrint Control

Software - Flow Chart

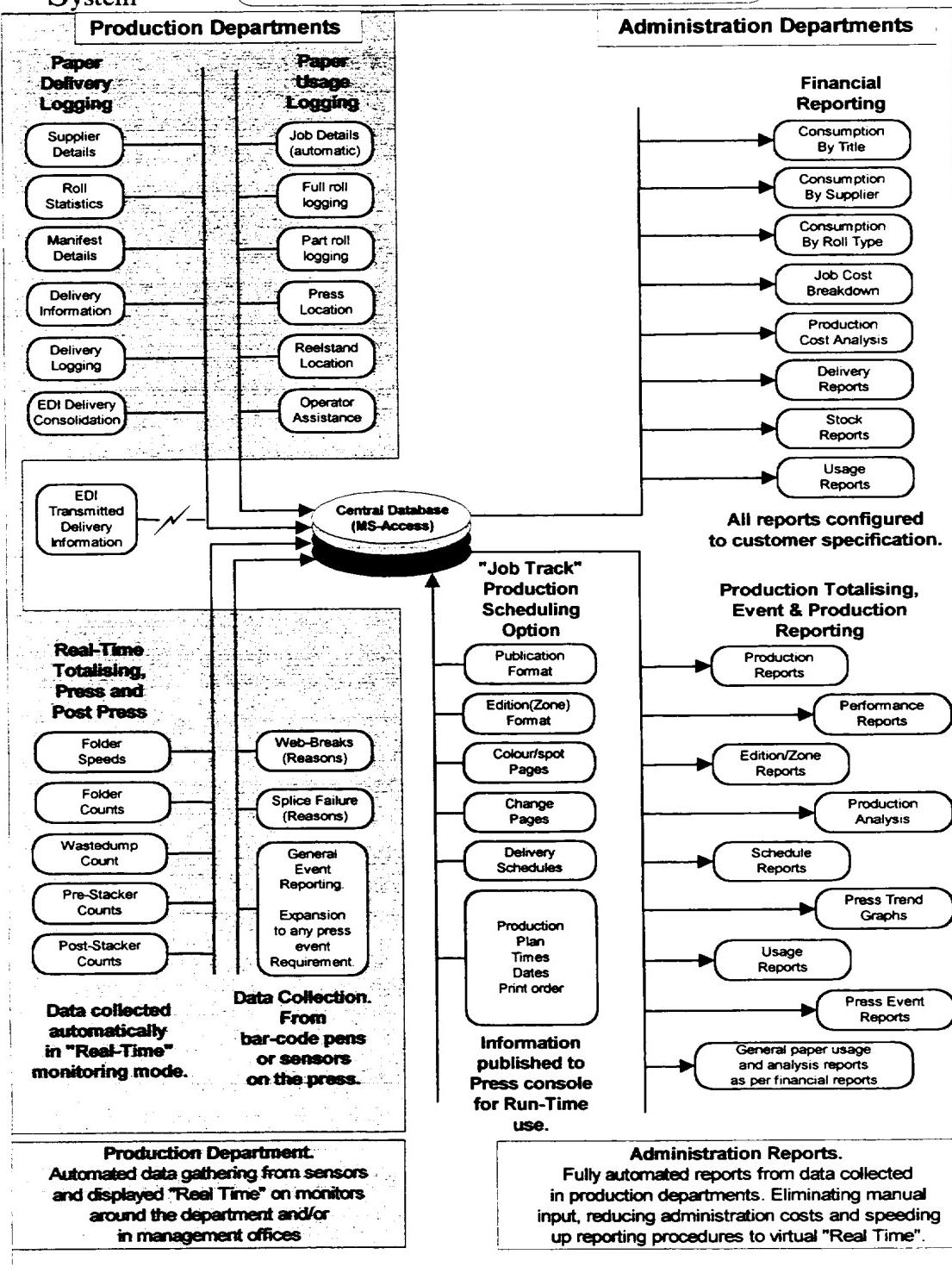


FIG6

MONITORING REELS OF PAPER
FOR USE ON PRINTING PRESSES

This invention relates to monitoring reels of paper for use on printing presses.

Reels of paper for use on printing presses are produced in paper mills. The reels of paper are large, heavy to handle and expensive. It is highly desirable to know at any instant where the reels of paper are. Thus, for example, it is highly desirable to know how many reels of paper are held in a warehouse for the paper mill, and it is also highly desirable due to cost not to lose reels of paper during transit from the paper mill to the printing press.

Hitherto, the paper industry has used bar codes for individual paper reel identification on a manual basis. More specifically, an operator is required to peel off sticky backed labels from the outer wrapper of a paper reel, and then to place the labels on a reelstand report sheet. If the operator forgets to do this, or the bar code labels get damaged, then the reel of paper is not able to be identified and it effectively becomes lost. Often so many errors occur in the manual paper reel identification system currently employed that a complete stock take of reels of paper in store is required. Such

a stock take will usually require existing bar code labels to be taken off the reels of paper and it is usual for each reel of paper to have at least four bar code labels on its outer wrapper. There can be up to 5000 reels of paper in stock in a mill warehouse at any site, and a stock reconciliation exercise can take up two days. In larger paper mills and warehouses, it is not unusual for up to 300 reels of paper to go missing in a week. For efficient operation, it is critical to know details of all the reels of paper. Also for efficient operation, it is critical to know if a reel of paper has been partly used or fully used. A reel of paper that has only been partly used is usually one without the bar code labels since the bar code labels usually become detached from their reel of paper directly the reel of paper starts to be unwrapped and used.

It is an aim of the present invention to reduce the above mentioned problems.

Accordingly, in one non-limiting embodiment, the present invention provides a reel of paper which has been produced by a paper mill and which is for use on a printing press, the reel of paper comprising a continuous length of paper wound on a core, and the core being provided with radio frequency tagging means whereby the positional progress of the reel of paper

from the paper mill to the printing press is able to be monitored, and whereby the use of the reel of paper at the printing press is also able to be monitored.

The provision of the radio frequency tagging means on the reel of paper enables the positional progress of the reel of paper from the paper mill to the printing press to be monitored. Thus the position of the reel of paper can be checked at a paper mill warehouse, on a delivery ship, on docks receiving the paper mill from the delivery ship, on road transport lorries, and in printing press warehouses. The use of the reel of paper at the printing press is also able to be monitored so that, for example, it is possible to know if a reel of paper has only been partially used.

The reel of paper may be one in which the radio frequency tagging means is positioned on the outside of the core. In this case, the radio frequency tagging means is preferably sandwiched between the outside of the core and the paper that is wound on the core.

The radio frequency tagging means may comprise a radio frequency chip which contains tagging data, an antenna, and encapsulating material for encapsulating the radio frequency chip and the antenna.

Preferably, the antenna is a length of a radio frequency conductive material which is wound in concentric rings in order to form a flat disc. The

radio frequency conductive material will usually be a metal. Copper is a presently preferred metal. Other metals may however be employed.

The encapsulating material is preferably plastics sheet material. The plastics sheet material is preferably in the form of first and second sheets of plastics material which sandwich therebetween the radio frequency chip and the antenna.

In another non-limiting embodiment, the present invention provides apparatus for the automatic tracking of a reel of paper of the invention, which apparatus comprises logging means for logging the radio frequency means after production of the reel of paper in the paper mill, first reader means for reading the radio frequency tagging means at at least one location between the paper mill and the printing press thereby to provide data on the location of the reel of paper, second reader means for reading the reel of paper as it is being used in the printing press thereby to provide data on the use of the reel of paper, and control means for receiving the data from the first and second reader means and for transmitting the data to at least one receiving station requiring information of the reel of paper.

The receiving station may be located, for example, at docks, warehouses served by lorries, publishers

offices, printing offices, accounts departments, or wherever else appropriate.

The logging means may be located at a packing line part of the paper mill.

The apparatus the invention is such that many reels of paper can be tracked in transit to and at many different printing presses in many different printing works.

An embodiment of the invention will now be described solely by way of example and reference to the accompanying drawings in which:

Figure 1 is an end view of a reel of paper;

Figure 2 is an end view of a core forming part of the reel of paper shown in Figure 1;

Figure 3 shows the core in an unwrapped condition, in order to illustrate the presence of radio frequency tagging means on the core;

Figure 4 shows schematically apparatus for the automatic tracking of the reel of paper shown in Figure 1;

Figure 5 shows apparatus for transferring selected data to various receiving stations requiring information on the reel of paper; and

Figure 6 is a software flow chart of software used in the apparatus of the invention.

Referring to Figures 1 - 4, there is shown a reel of paper 2 which has been produced by a paper mill 4 and which is for use on a printing press 6. The reel of paper 2 comprises a continuous length of paper 8 rolled on a cardboard core 10. The core 10 is provided with radio frequency tagging means 12 whereby the positionable progress of the reel of paper 2 from the paper mill 4 to the printing press 6 is able to be monitored, and whereby the use of the reel of paper 2 at the printing press 6 is also able to be monitored.

As can be seen from Figures 1, 2 and 3, the radio frequency tagging means 12 is positioned on the outside of the core 10 such that it is sandwiched between the outside of the core 10 and the paper 8 that is rolled on the core 10.

The radio frequency tagging means 12 comprises a radio frequency chip 14 which contains tagging data, an antenna 16, and encapsulating material for encapsulating the radio frequency chip 14 and the antenna 16.

The antenna 16 is a length of radio frequency conductive material in the form of copper which is wound in concentric rings in order to form a flat disc. The encapsulating material is first and second sheets of plastic material which sandwich between them the radio frequency chip 14 and the antenna 16. The entire radio frequency tagging means 12 is thin and flexible as can

be appreciated from Figures 1 and 2. Thus the radio frequency tagging means 12 is easily able to conform to the outer surface of the core 10, and it is easily able to be held in place on the outer surface of the core 10 by the paper 8 as it is wound round the core 10.

As can be seen from Figure 4, the reel of paper 2 is produced in the paper mill 4. The radio frequency tagging means 12 is applied on a packing line 18. The radio frequency tagging means 12 is also logged by logging means 19 on the packing line 18. The reel of paper 2 then passes to a warehouse 20 where it is stored with other reels of paper 2 which are also provided with the radio frequency tagging means.

As shown in Figure 4, the reel of paper 2 can be transported from the warehouse 20 to the printing press 6 by sea and land, or by land only. For transportation by sea, Figure 4 shows a ship 22 bringing imported paper deliveries in the form of reels of paper 2. When each reel of paper 2 is unloaded from the ship 22, the radio frequency tagging means 12 is read by first reader means 24 in order to provide data on the location of the reel of paper 2. The data can be read into a docks manifest and reconciliation can be affected as shown in Figure 4. Another first reader means 26 can read the radio frequency tagging means 12 and provide more information prior to the reel of paper 2 being loaded onto a lorry

28 for destination to a warehouse 30 of the printer. When the reel of paper 2 is unloaded from the lorry 28, the radio frequency tagging means can again be read by another first reader means 32. As shown in Figure 4, forklift trucks 34 can be employed for loading and unloading of the reel of paper 2 at various locations. The forklift trucks 34 employed can be provided as appropriate with one of the first reader means 24, 26, 32.

When the reel of paper 2 is taken from the warehouse 30, it is placed on the printing press 6 and used as shown schematically in Figure 4. The reel of paper 2 can be read by second reader means (not shown) for providing information on the use of the reel of paper 2 at the printing press 6. Thus, for example, the second reader means may provide information on the amount of paper 8 left on the core 10 and/or the condition of the paper. Any suitable and appropriate information may be provided.

As shown in Figure 4, information obtained from the second reader means can be linked via line 36 back to the paper mill 4, for example in order to report on breaks in the paper 8, splice failures, and/or runability for the reel of paper 2. Figure 4 also illustrates by lines how data provided by the first reader means 24, 26, 32 can be provided at different

required stations 38 requiring the information. Thus Figure 4 shows complete apparatus 40 for the automatic tracking of a reel of paper 2.

Figure 5 shows a self-explanatory general hardware configuration for apparatus 42 which forms part of the apparatus 40.

Figure 6 shows a software flowchart of software used in the apparatus 40 shown in Figure 4. The flowchart is self-explanatory.

It is to be appreciated that the embodiment of the invention described above with reference to the accompanying drawings has been given by way of example only and that modifications may be effected. Thus, for example, the radio frequency tagging means 12 may be of a shape and/or a construction different to that described.

CLAIMS

1. A reel of paper which has been produced by a paper mill and which is for use on a printing press, the reel of paper comprising a continuous length of paper wound on a core, and the core being provided with radio frequency tagging means whereby the positional progress of the reel of paper from the paper mill to the printing press is able to be monitored, and whereby the use of the reel of paper at the printing press is also able to be monitored.
2. A reel of paper according to claim 1 in which the radio frequency tagging means is positioned on the outside of the core.
3. A reel of paper according to claim 2 in which the radio frequency tagging means is sandwiched between the outside of the core and the paper that is wound on the core.
4. A reel of paper according to any one of the preceding claims in which the radio frequency tagging means comprises a radio frequency chip which contains tagging data, an antenna, and encapsulating material for encapsulating the radio frequency chip and the antenna.

5. A reel of paper according to claim 4 in which the antenna is a length of radio frequency conductive material which is wound in concentric rings in order to form a flat disc.
6. A reel of paper according to claim 5 in which the radio frequency conductive material is a metal.
7. A reel of paper according to claim 6 in which the metal is copper.
8. A reel of paper according to any one of claims 4 - 7 in which the encapsulating material is a plastics sheet material.
9. A reel of paper according to claim 8 in which the plastics sheet material is in the form of first and second sheets of plastics material which sandwich therebetween the radio frequency chip and the antenna.
10. A reel of paper substantially as herein described with reference to Figures 1 - 3 of the accompanying drawings.

11. Apparatus for the automatic tracking of a reel of paper as claimed in any one of the preceding claims, which apparatus comprises logging means for logging the radio frequency tagging means after production of the reel of paper in the paper mill, first reader means for reading the radio frequency tagging means at at least one location between the paper mill and the printing press thereby to provide data on the location of the reel of paper, second reader means for reading the reel of paper as it is being used in the printing press thereby to provide data on the use of the reel of paper, and control means for receiving the data from the first and second reader means and for transmitting the data to at least one receiving station requiring information on the reel of paper.

12. Apparatus according to claim 11 in which the logging means is located at a packing line part of the paper mill.

13. Apparatus for the automatic tracking of a reel of paper, substantially as herein described with reference to Figures 3 - 6 of the accompanying drawings.



Application No: GB 9800547.3
Claims searched: 1-13

Examiner: Catherine Schofield
Date of search: 9 March 1999

Patents Act 1977

Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H4L (LASS, LADTX, LADXX, LADX, LAX, LACX)

Int Cl (Ed.6): G01V: 15/00; G06K: 7/10

Other: Online:- WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 2288712 A (MESSER GRIESHEIM) - see abstract and fig. 1.	1
Y	GB 2274521 A (HITACHI) - see abstract	1
Y	GB 2269964 A (WALK OFF MATS) - see abstract and figure.	1
Y	US 5448110 (TUTTLE & LAKE) - see abstract, fig. 9 and column 9, lines 16-31 and column 10, lines 8 - 15.	4, 8, 9
X, Y	NL 9400392 (SALLMETALL) - see WPI Abstract Accession No. 95-342555 [44]	X:1 Y:1, 4, 8, 9

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	& Member of the same patent family		
E	E Patent document published on or after, but with priority date earlier than, the filing date of this application.		